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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Mikhail Lyakh

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INTEL CORPORATION

c/o CPA Global

P.O. BOX 52050

MINNEAPOLIS, MN 55402

EXAMINER

GIDADO, RASHEED

ART UNIT

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2464

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,950	Applicant(s) LYAKH ET AL.	
	Examiner RASHEED GIDADO	Art Unit 2464	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims 1-28 are pending in this application filed August 9, 2006.

Claim Objections

1. Claims 3, 10, 17 and 24 are objected to because of the following informalities:
"is" recited in last line of claims 3, 10, 17 and 24 should be removed. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 2-3, 7, 9-10, 14, 16-21, 23-24 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 2, 9, 16 and 23; the term "channel smoothness property" in last line of each claim is a vague term which renders the claim indefinite. The term "channel smoothness property" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term cannot be readily construed to have regard to the specific technical features it seeks to define. For examination purpose, the term will be construed to mean "channel property."

Regarding claim 12 and 19, the claim 12 line 2 and claim 15 line 3 recites the limitation "said wireless station". There is insufficient antecedent basis for this limitation in the claim.

Regarding claims 3, 10, 17 and 24; the value " N_{mod} " recited in the claims is undefined and lacks antecedent basis.

Regarding claims 7, 14, 21 and 28; the claims recite the term "developing fast methods". This term makes the claims unclear and indefinite. One skill in the art reading the claim will be left in doubt as to which specific technical method steps are being implemented by the wireless station.

Regarding claims 16-21, the claims recite multiple "further comprising" which renders the claims indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. It is also unclear whether the instructions defined in independent claim 15 perform the further operations as defined in claims 16-21 or whether claims 16-21 seek protection for further instructions destined for these operations. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 8-21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 8, it is rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Method steps which do not have physical structure to perform the method and do not perform a physical transformation are non-statutory subject matter. While the claims recite steps or acts to be performed, a statutory “process” under 35 U.S.C. 101 must (1) be tied to a particular machine, or (2) transform underlying subject matter (such as article or material) to a different state or thing. See page 10 of *In Re Bilski* 88 USPQ 2nd 1385. The instant claim is neither positively tied to a particular machine that accomplishes the claimed method steps nor transforms underlying subject matter, and therefore do not qualify as a statutory process. The claimed methods, including various steps are broad enough that the claim could be completely performed mentally, verbally or without a machine.

Regarding claims 9-14; none of the claims 9-14 dependent upon claim 8 corrects these deficiencies; therefore the dependent claims are also directed to non-statutory subject matter.

Regarding claim 15, the claim is directed to non-statutory subject matter. The claim recites “machine-accessible medium”, and the specification disclosed “the storage medium include any type of media suitable for storing electronic instructions” (see the application publication, ¶ 0009). Since computer-readable medium covers both transitory and non-transitory embodiments, the claim is construed to contain transitory embodiment of computer readable medium and it is non-statutory. During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow See *In re Zletz*, 893 F.2d 319 (Fed. Cir. 1989). The broadest reasonable interpretation of a claim drawn to computer readable medium typically covers forms of non-transitory tangible media and transitory propagating signals per se in view of ordinary and customary meaning of computer readable media, particularly when the specification is silent on type of computer readable media. See MPEP 2111.01 and *In re Nuijten*, 500 F.3d 1346, 1356-57 (Fed. Cir. 2007) (transitory embodiments are not directed to statutory subject matter).

Regarding claims 16-21, none of the claims dependent on claim 15 corrects the deficiencies as stated above; therefore, the dependent claims are also directed to non-statutory subject matter.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-2, 5-9, 12-16, 19-23 and 26-28 are rejected under 35 U.S.C. 102(e) as being anticipated by US Pub. 2005/0195905 to John Kowalski (hereafter referenced as Kowalski).

Regarding claim 1, Kowalski discloses an apparatus, comprising:

a wireless station (Fig 2 Data Transmitter 201, Data Receiver 202) operable in a wireless network (§ 0005: OFDM wireless LAN system) using an adaptive bitloading (ABL) technique (see abstract, § 0005, § 0009 and § 0020: using adaptive bitloading technique), wherein said wireless station is capable of using a predetermined limited set of modulation patterns to perform said ABL (Fig 2 ABL vector codebook of block 207; abstract: predetermined level of modulation; § 0009, § 0020 and § 0025-§ 0028: receiver codebook contains a limited set of representation vectors representing the received signal-to-noise ratio (SNR) on all used carriers. This reduces system overhead by using reduced computational complexity).

Regarding claim 2, Kowalski discloses the apparatus wherein said predetermined limited set of modulation patterns is limited by some number (¶ 0025, ¶ 0030: using a codebook having limited number of modulation for performing ABL compression and using training set of simulated received SNR vectors to find the codebook that most appropriately represents the SNR vector distribution), which is based on channel smoothness property (¶ 0025, ¶ 0030: the SNR vector distribution contain information on the channel's property or smoothness, which can be variation of the SNR profile during the simulated time period).

Regarding claim 5, Kowalski discloses the apparatus further comprising at least one additional wireless station that is capable of receiving packets from said wireless station and upon packet reception of said packets by said at least one additional wireless station, said at least one additional wireless station determines which of said N_{BL} patterns is best for current channel conditions and sends back to said wireless station an index of a pattern instead of said pattern itself (see ¶ 0020 and ¶ 0025-0027).

Regarding claim 6, Kowalski discloses the apparatus wherein said wireless station uses said pattern index to obtain said bitloading pattern, modulate data with said pattern, and send data to said at least one additional wireless station advanced by said bitloading pattern index (see ¶ 0027).

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Regarding claim 7, Kowalski discloses the apparatus wherein said wireless station is capable of developing fast methods for searching a closest bitloading pattern in a given pattern set by specific indexing of said pattern set (§ 0020 and § 0025-0026: Kowalski discloses searching for a nearest neighbor match closest bitloading pattern as claimed).

Regarding claim 8, it is rejected for the same reasons as set forth in claim 1.

Regarding claim 9, it is rejected for the same reasons as set forth in claim 2.

Regarding claim 12, it is rejected for the same reasons as set forth in claim 5.

Regarding claim 13, it is rejected for the same reasons as set forth in claim 6.

Regarding claim 14, it is rejected for the same reasons as set forth in claim 7.

Regarding claim 15, it is rejected for the same reasons as set forth in claim 1.

Regarding claim 16, it is rejected for the same reasons as set forth in claim 2.

Regarding claim 19, it is rejected for the same reasons as set forth in claim 5.

Regarding claim 20, it is rejected for the same reasons as set forth in claim 6.

Regarding claim 21, it is rejected for the same reasons as set forth in claim 7.

Regarding claim 22, it is rejected for the same reasons as set forth in claim 1.

Regarding claim 23, it is rejected for the same reasons as set forth in claim 2.

Regarding claim 26, it is rejected for the same reasons as set forth in claim 5.

Regarding claim 27, it is rejected for the same reasons as set forth in claim 6.

Regarding claim 28, it is rejected for the same reasons as set forth in claim 7.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 3-4, 10-11, 17-18 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pub. 2005/0195905 to John Kowalski (hereafter referenced as Kowalski).

Regarding claim 3, Kowalski disclose the apparatus of claim 1. The apparatus wherein said number of allowed patterns is limited to some set of N_{BL} patterns which is less than N_{mod}^{NSC} patterns with N_{NSC} being the number of subcarriers in an OFDM symbol is implicitly disclosed in Kowalski as ABL map compression using a vector quantization-based technique to perform a nearest neighbor match based on representation vector and minimization of selected metric (see ¶ 0025, ¶ 0026 and ¶ 0030). It would have been obvious to one of ordinary skill in the art at the time of the

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invention based on common knowledge in the art to understand that performing nearest neighbor match as disclosed by Kowalski, which implies reducing number of allowable patterns must be reduced for compression to take place is the same as limiting modulation patterns with respect to theoretical maximum as disclosed in the invention. The motivation for doing so is to reduce system overhead by reducing implementation complexity (see Kowalski, ¶ 0008, ¶ ¶ 0019 and ¶ 0025).

Regarding claim 4, Kowalski further discloses the apparatus wherein said N_{BL} patterns are stored a-priori (Fig 2 Blocks 207/208; ¶ 0020, ¶ 0025-0027: allowable modulation patterns are known from two codebooks).

Regarding claim 10, it is rejected for the same reasons as set forth in claim 3.

Regarding claim 11, it is rejected for the same reasons as set forth in claim 4.

Regarding claim 17, it is rejected for the same reasons as set forth in claim 3.

Regarding claim 18, it is rejected for the same reasons as set forth in claim 4.

Regarding claim 24, it is rejected for the same reasons as set forth in claim 3.

Regarding claim 25, it is rejected for the same reasons as set forth in claim 4.

Conclusion

12. **Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Pub. 2005/0034053 to Jacobsen et al. discloses adaptive bit loading with low density parity check forward error correction.
- US Patent 6,134,273 to Wu et al. discloses bit loading and rate adaptation.
- US Pub. 2005/0157638 to Maltsev et al discloses puncturing technique for multicarrier systems.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to RASHEED GIDADO whose telephone number is (571)270-7645. The examiner can normally be reached on Monday to Thursday 9:00-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ricky Ngo/
Supervisory Patent Examiner, Art Unit 2464

RASHEED GIDADO
Examiner
Art Unit 2464